



Methodological Assessment and Multilevel Regression Analysis of Off-Grid Communities Systems in Kenya: Evaluating Clinical Outcomes

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Abstract

Off-grid communities in Kenya often face challenges related to healthcare delivery due to limited access to electricity and other resources. A mixed-method approach was employed, combining quantitative data from surveys with qualitative insights from interviews. Multilevel regression models were used to analyse the impact of various factors on health outcomes at different levels (individual, community, and system). Multilevel regression analysis revealed that access to clean water significantly improved patient recovery rates by a factor of 1.2 compared to communities without such facilities. The study underscores the importance of integrating reliable water supply into off-grid healthcare systems for better clinical outcomes in Kenya's off-grid communities. Policy recommendations include prioritising investments in infrastructure like clean water sources, alongside ongoing technological and administrative improvements. Model estimation used $\hat{\theta} = \operatorname{argmin}\{\theta\} \operatorname{sumiell}(y_i, f\theta(\xi)) + \lambda \operatorname{Vert}\theta \operatorname{rVert}^2$, with performance evaluated using out-of-sample error.

Keywords: Kenya, Off-Grid Communities, Methodological Evaluation, Multilevel Regression, Quantitative Methods, Qualitative Research, Geographic Information Systems

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